USING A SHAPE-CHANGING DISPLAY AS AN ADAPTIVE LENS FOR SELECTIVELY MAGNIFYING INFORMATION DISPLAYED ONSCREEN

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This is the first application filed for the present technology.

TECHNICAL FIELD

[0002] The present disclosure relates generally to wireless communications devices and, in particular, to graphical user interfaces or display screens of wireless communications devices.

BACKGROUND

[0003] Wireless communications devices such as the BlackBerry® by Research in Motion Limited provide a variety of useful functions, such as voice communication, e-mail and Web browsing. These wireless devices typically include a full QWERTY-style keyboard or a reduced keypad to enable a user to enter alphanumeric text. In addition, either a trackball or a thumbwheel can be provided for scrolling or moving the cursor. Some new-generation devices incorporate touchscreen technology in which the user presses the screen with a finger, thumb or stylus. Touchscreen technology enables the display to present keys for data entry that are customized to the specific application or circumstances. However, one of main shortcomings of touchscreen technology is that they do not provide any tactile feedback to the user. In other words, the absence of any three-dimensional physically protruding keys makes the touchscreen prone to typing or onscreen selection errors. A solution proposed by the applicant is to employ shape-changing touch-sensitive display screens that have shape-changing zones that can be electrically (or possibly also magnetically) actuated to expand to form protruding keys. This technology is described in Applicant's U.S. patent application Ser. No. xx/xxx,xxx entitled "Shape-Changing Display for a Handheld Electronic Device". Shape-changing technologies and related techniques are described in a number of references, e.g. U.S. Pat. No. 6,287,485, U.S. Pat. No. 7,212,332, U.S. Pat. No. 5,739,946, and U.S. Pat. No. 6,894,677.

[0004] A general shortcoming of all modern handheld electronic devices, such as the ubiquitous wireless communications devices, is that the limited size of the display screen makes viewing difficult at times. Although most of these handheld devices include basic zoom functions for magnifying the image onscreen, these zoom functions magnify the entire image, thus resulting in an inevitable loss of context (due to the loss of information peripheral to the screen area being zoomed). Accordingly, techniques to selectively magnify an onscreen object (or to zoom in on a portion of the display) remain highly desirable, particularly in the context of the increasingly popular touchscreen devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Further features and advantages of the present technology will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0006] FIG. **1** is a block diagram schematically illustrating pertinent components of a wireless communications device and of a wireless communications network;

[0007] FIG. **2** is a more detailed block diagram of a wireless communications device;

[0008] FIG. **3**A is a system diagram of network components which provide mapping functionality in the wireless communications devices of FIG. **1** and FIG. **2**;

[0009] FIG. **3**B illustrates a message exchange between a wireless communications device and a map server for downloading map content to the wireless communications device based on the system of FIG. **3**A;

[0010] FIG. **3**C is a diagram showing a preferred Maplet data structure;

[0011] FIG. **4** is a schematic depiction of a wireless network having an applications gateway for optimizing the downloading of map data from map servers to wireless communications devices;

[0012] FIG. **5** is a flowchart presenting steps of a method of magnifying (or "zooming in" on) map information displayed on a touchscreen in accordance with implementations of the present technology;

[0013] FIG. **6** is another flowchart presenting steps of a method of magnifying a map route displayed on a touchscreen in accordance with implementations of the present technology;

[0014] FIG. **7** is a cross-sectional view of an shape-changing touch-sensitive display screen used for creating an adaptive lens in accordance with implementations of the present technology;

[0015] FIG. **8** is an example of a typical map downloaded to, and displayed on, a wireless communications device;

[0016] FIG. **9** schematically depicts an arbitrarily positioned magnifying lens for visually magnifying a target area on the display in accordance with one implementation of the present technology;

[0017] FIG. **10** is an example of a map showing a current position of the wireless device downloaded to, and displayed on, the display screen of the wireless device;

[0018] FIG. **11** schematically depicts a magnifying lens formed at the onscreen location representing the current position of the device in accordance with another implementation of the technology;

[0019] FIG. **12** is an example of a map showing a route from a starting location to a destination location;

[0020] FIG. **13** schematically depicts a moving magnifying lens that propagates along the route in accordance with another implementation of the technology;

[0021] FIG. **14** is another example of a map showing a route from a starting location to a destination location at a zoom level where map details are not easily readable; and

[0022] FIG. **15** schematically depicts an oblong magnifying lens formed over the entire route, thus magnifying map details that would ordinarily not be easily readable at that zoom level.

[0023] It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

[0024] The present technology addresses and solves the technical problem of how to selectively magnify only a portion of the onscreen information displayed on a device such as